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# Common Seaweeds and Seagrasses of India



**Herbarium**  
**Volume 1**

# Common Seaweeds and Seagrasses of India

## **HERBARIUM**

Vol.1

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# **Common Seaweeds and Seagrasses of India**

## **Herbarium Vol.1**

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## Foreword

The Central Marine Fisheries Research Institute, under the ICAR has been undertaking basic, strategic and applied research in marine fisheries for the past six decades. Being a signatory to the Convention on Biological Diversity (CBD) and realising the need to establish national referral centres for marine organisms, the Institute modernised the Marine Biodiversity Museum at its headquarters at Cochin. Padma Vibhushan Prof. M.S. Swaminathan inaugurated this Museum on 4th February, 2006. Subsequently, as per section 39 of the Biological Diversity Act, 2002, the Institute was recognized as a 'Designated National Repository' by the Government of India, with authorisation to keep specimens of different categories of biological material in safe custody.

The Museum displays organisms including fishes, echinoderms, molluscs, crustaceans, corals, seaweeds etc. collected from a wide spectrum of niches ranging from estuaries to coastal and deeper waters of the Indian seas. Forming a major component of the collections in the Museum, the seaweeds and seagrasses evince a lot of interest among visitors due to their importance as a source of food, fodder, industrial products and bioactive compounds. My colleagues in the Marine Biodiversity Division have processed and laminated samples of these plant materials without much change in colour and texture.

It is with great satisfaction that I introduce a unique collection of seaweeds and seagrasses as herbaria in the Biodiversity Museum of CMFRI. The new technique of laminating the herbaria after processing and preserving has yielded excellent results. I congratulate and compliment the team led by Dr. Mary K. Manisseri, Head, Marine Biodiversity Division for the efforts put in for bringing out this unique herbaria. I hope this novel attempt would instil enthusiasm among students and researchers and this would be of immense use in both education and research.

Dr. G. Syda Rao  
Director

Central Marine Fisheries Research Institute



## **Preface**

The Marine Biodiversity Division of the Central Marine Fisheries Research Institute, Cochin, established in the year 2004 with the prime mandate of developing biodiversity knowledge-base is bestowed with the task of maintaining and updating the collections in the Designated National Repository Museum of the Institute. The splendid display of around 1600 specimens in the Museum offers a glimpse of the bioresources of the Indian seas. The collections attract students, teachers, scientists and the general public with students forming more than 85% of the total visitors.

Marine plants are one among the prime exhibits in the Museum. An attempt has now been made to display seaweeds and seagrasses as herbaria along with the wet preserved samples. The plants were collected from the southeast and southwest coasts of India during 2009-2010. Of the Herbaria prepared, 72 species of seaweeds and 7 species of seagrasses have been displayed in the Marine Biodiversity Museum at Cochin with duplicates of 46 species of seaweeds and 5 species of seagrasses in the Museum of the Regional Centre of CMFRI at Mandapam. Herbaria have also been bound with 18 species of green algae, 12 species of brown algae and 6 species of seagrasses as Vol. I and 34 species of red algae as Vol. II. This procedure of processing and laminating plant materials, if adopted, would go a long way in serving as an effective tool both in education and research. I hope this would be of immense use to those engaged in plant taxonomy and biodiversity studies.

The encouragement and guidance given by Dr. G. Syda Rao, Director, CMFRI is gratefully acknowledged. We are greatly indebted to Dr. M. Umamaheswara Rao, Retd. Professor, Andhra University, for his expert advice without which this work would not have been completed. The help rendered by Dr. V.S.K. Chennubhotla, Shri J.R. Ramalingam and Ms. E. G. Reshmi in the collection, identification and preparation of herbaria is gratefully acknowledged. Sincere thanks are due to Mrs. T. S. Naomi, Dr.(Mrs.) Rani Mary George, Dr. G. Gopakumar, Dr.(Mrs.) S. Jasmine, Dr. K. Vinod, Shri. V. J. Thomas, Mrs. P.M. Geetha and Shri. K.M. Sreekumar for their co-operation which facilitated smooth execution of the work.

Dr. Mary K. Manisseri  
Head, Marine Biodiversity Division  
Central Marine Fisheries Research Institute

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# SEAWEEDS AND SEAGRASSES

- Seaweeds are group of plants that live either in marine or brackishwater environments and dominate the rocky intertidal regions of most oceans.
- Marine algae are classified under three classes:

**Chlorophyceae** (Green algae)

**Phaeophyceae** (Brown algae)

**Rhodophyceae** (Red algae)

based on the predominance of pigments chlorophyll *a* and *b*, fucoxanthin and phycoerythrin respectively.

- Worldwide, 9200 species of seaweeds are reported ([www.patentlens.net](http://www.patentlens.net)) with red algae comprising of 6000, brown algae 2000 and green algae 1200 species.
- The marine environment is also inhabited by flowering plants commonly called **seagrasses** confined to sandy and muddy intertidal regions.
- Seagrasses are placed under the class Monocotyledonae. About 66 species under 14 genera are reported worldwide (Anthony *et al.*, 2006).

# GREEN ALGAE

## CLASS CHLOROPHYCEAE

- Green algae are mostly found in the intertidal zone and mangrove swamps.
- From the Indian waters, 213 species under 43 genera have been reported (Kaliaperumal and Kalimuthu, 2004).
- Range from unicellular motile forms to multicellular parenchymatous forms. Characteristic pigments are chlorophyll *a* and *b*. Secondary pigments are carotenes, lutein and zeaxanthin.
- Important food source for fishes, crustaceans and gastropods. Green algae like *Ulva*, *Caulerpa* and *Enteromorpha* are used as salad and in soups. Food reserves are starch and fructosans.
- Bioactive compounds like diterpenes, sesquiterpenes, triterpenes and ceramides have been isolated from a number of genera especially *Caulerpa*, *Chaetomorpha* and *Ulva*.
- Bioactive compounds from green algae are known to have antifungal, antitumor and antiviral properties.



*Bryopsis pennata* Lamouroux, 1809

AA.4.1.1.1 Date: 26-2-2009 Locality: Cochin



*Caulerpa laetevirens* Montagne, 1842

AA.4.2.1.7 Date: 2-2-2010 Locality: Palk Bay





*Caulerpa peltata* Lamouroux, 1809

AA.4.2.1.1 Date: 26-5-2009 Locality: Palk Bay



*Caulerpa racemosa* (Forssk.) J.Ag., 1873

AA.4.2.1.2 Date: 26-5-2009 Locality: Palk Bay



*Caulerpa scalpelliformis* (R.Br.) C.Ag., 1817

AA.4.2.1.3 Date: 25-5-2009 Locality: Gulf of Mannar



*Caulerpa serrulata* (Forssk.) J.Ag., 1837

AA.4.2.1.6 Date: 4-2-2010 Locality: Palk Bay



*Caulerpa sertularioides* (Gmelin) Howe, 1905

AA.4.2.1.4 Date: 26-5-2009 Locality: Palk Bay





*Caulerpa taxifolia* (Vahl.) C.Ag., 1817

AA.4.2.1.5 Date: 25-5-2009 Locality: Gulf of Mannar





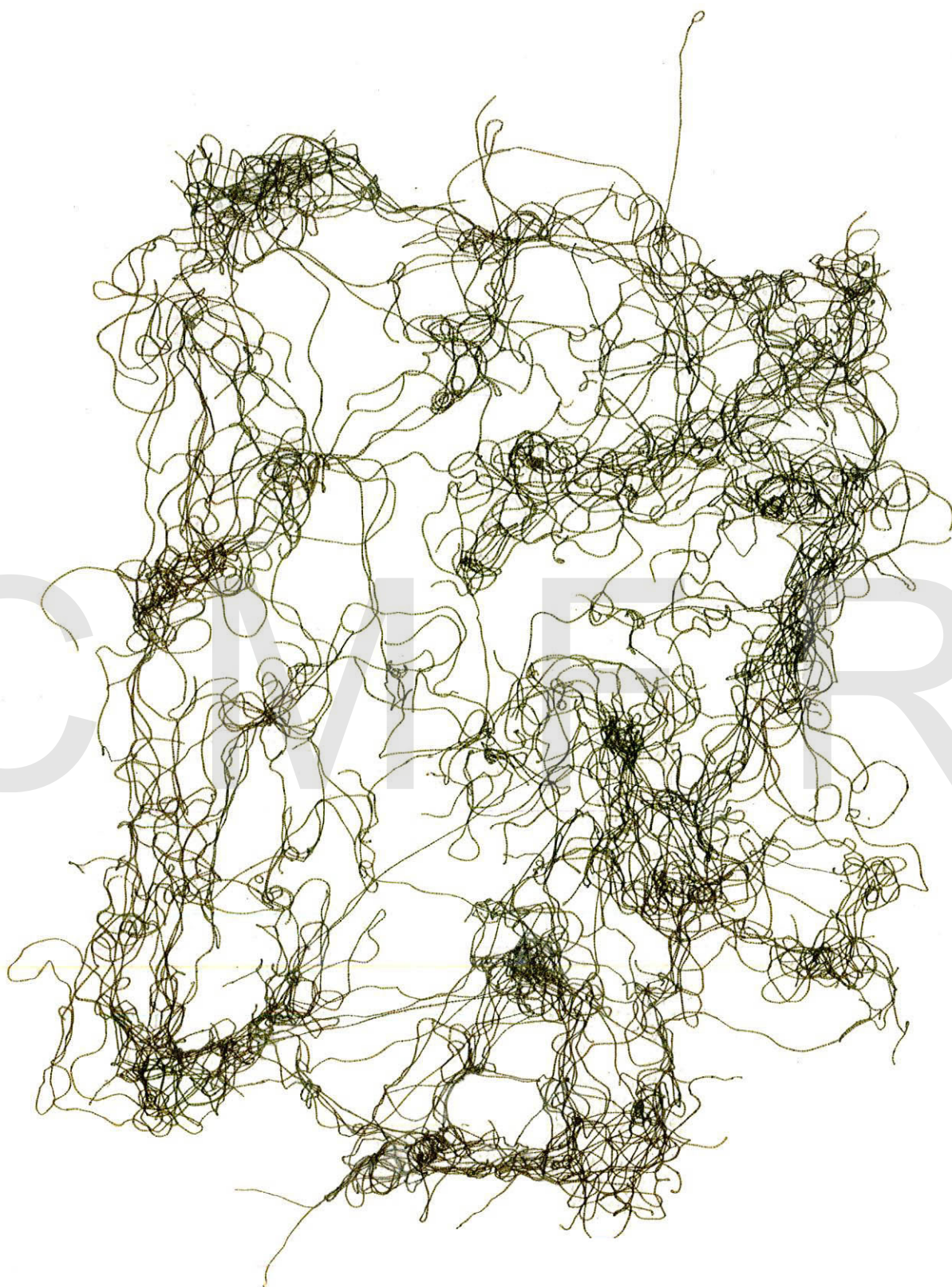
*Chaetomorpha aerea* (Dillw.) Kuetz., 1849

AA.2.1.1.3 Date: 25-5-2009 Locality: Gulf of Mannar



*Chaetomorpha antennina* Kuetz., 1847

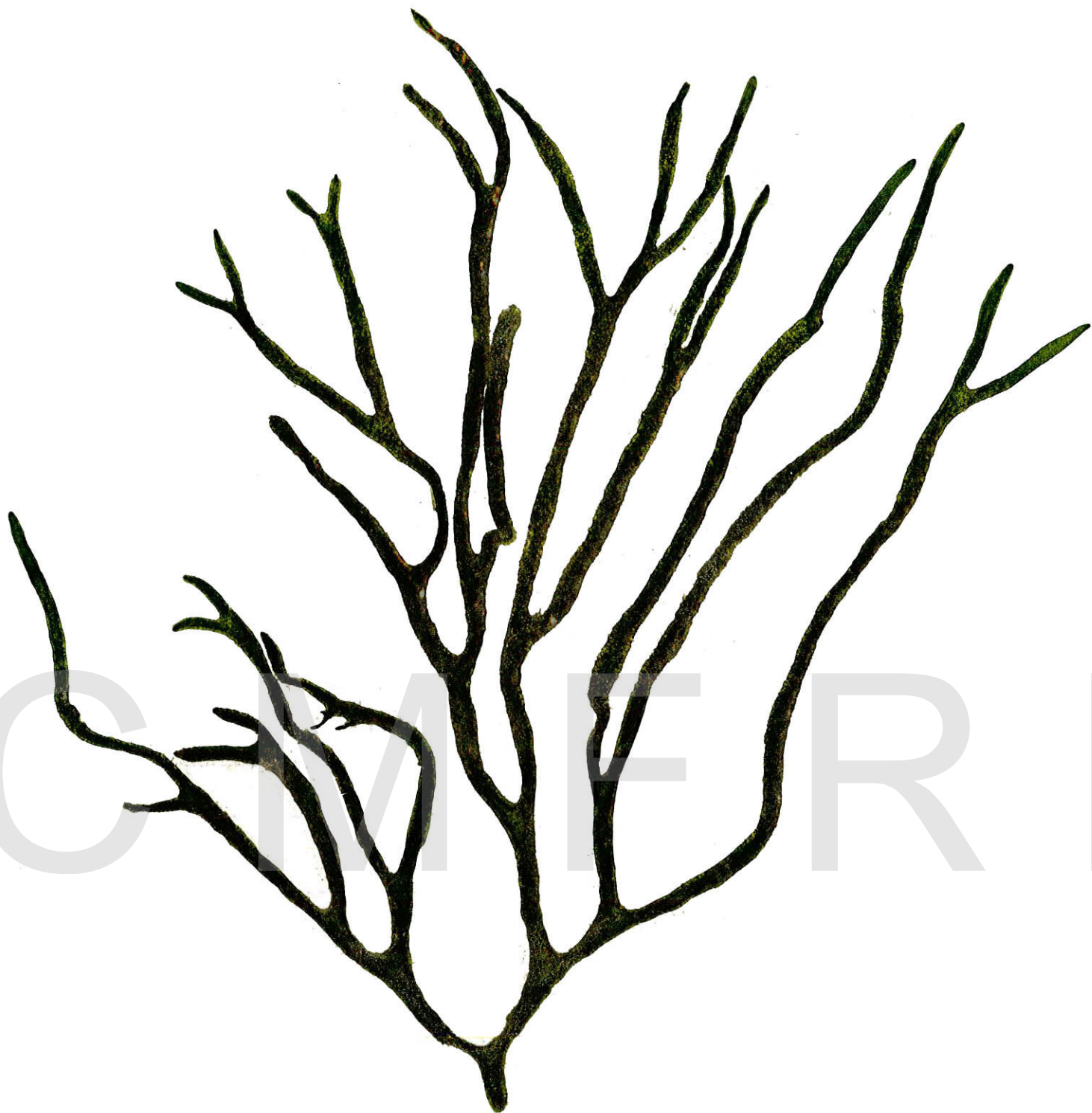
AA.2.1.1.1 Date: 27-5-2009 Locality: Gulf of Mannar



*Chaetomorpha linum* (Muller) Kuetz., 1845

AA.2.1.1.2 Date: 26-5-2009 Locality: Palk Bay





*Codium dwarkense* Borgesen, 1947

AA.4.4.1.2 Date: 3-2-2010 Locality: Palk Bay



*Enteromorpha compressa* (Linn.) Nees, 1820

AA.1.1.1.1 Date: 26-5-2009 Locality: Palk Bay



*Halimeda gracilis* Harv. ex J. Ag., 1887

AA.4.5.1.1 Date: 26-5-2009 Locality: Palk Bay





*Halimeda macroloba* Decaisne, 1841

AA.4.5.1.2 Date: 4-2-2010 Locality: Palk Bay



*Ulva lactuca* Linnaeus, 1753

AA.1.1.2.1 Date: 26-5-2009 Locality: Palk Bay



*Ulva reticulata* Forsskal, 1775

AA.1.1.2.2 Date: 26-5-2009 Locality: Palk Bay



*Valoniopsis pachynema* (G.Martens) Borges., 1934

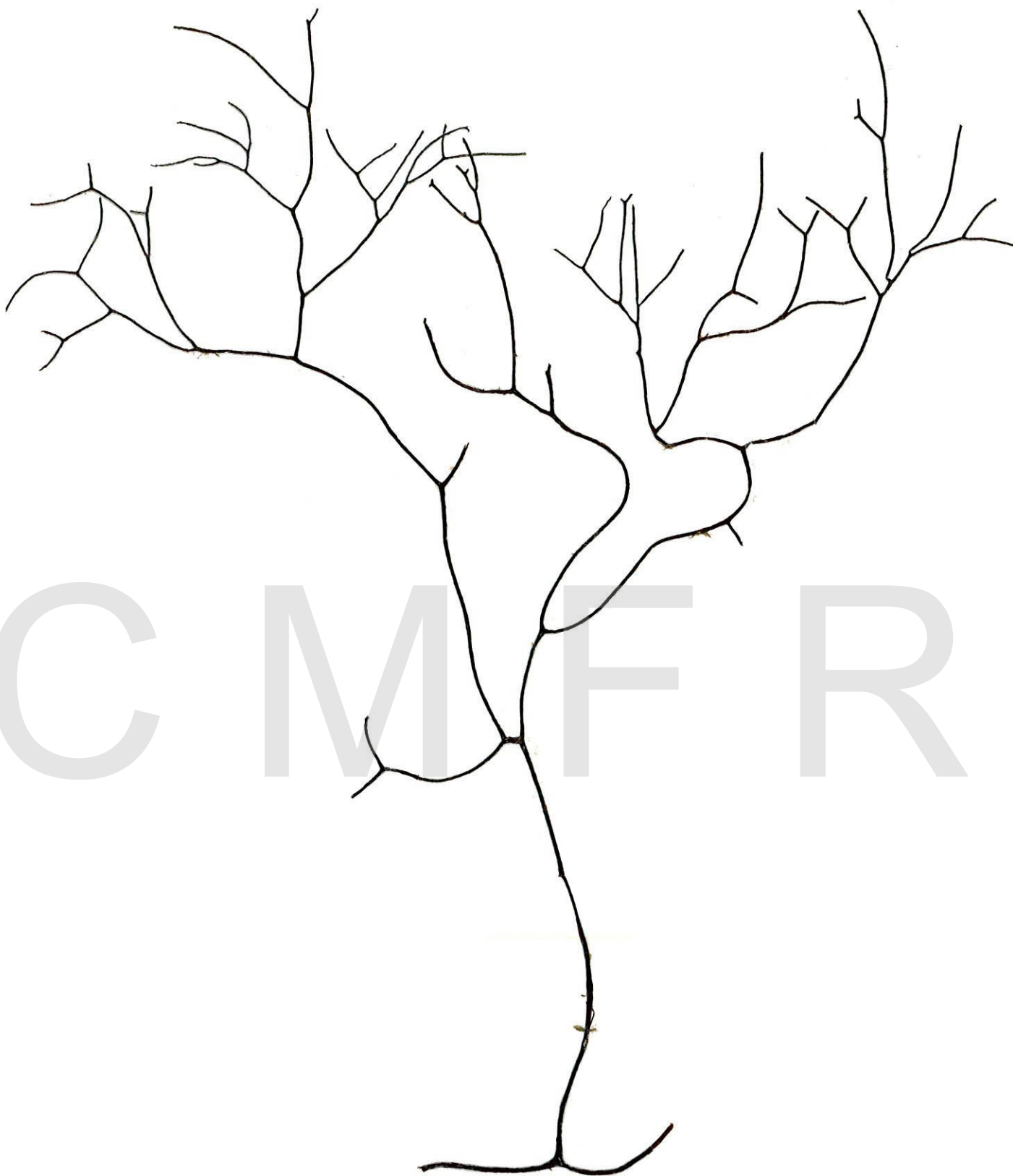
AA.3.1.2.1 Date: 26-5-2009 Locality: Palk Bay



# BROWN ALGAE

## CLASS PHAEOPHYCEAE

- Brown algae are mostly marine, found in intertidal and subtidal reefs. They play an important role in marine environment both as food and habitat for marine organisms.
- From the Indian waters, 289 species under 37 genera have been reported (Kaliaperumal and Kalimuthu, 2004).
- Range from small sized filamentous forms of about 1 cm to giant kelps of 20-60 m.
- Primary pigments chlorophyll *a* and *c* are present along with the accessory pigments, carotenes and xanthophylls. Presence of the xanthophyll pigment fucoxanthin gives the characteristic brown colour. The reserve food is mannitol and laminarin starch.
- Algin, a hydrocolloid substance extracted from brown algae is used as a thickening agent in food products like sherbert, ice cream etc. and as a stabilizer in paints and ointments.
- Important algin yielding genera available in India are *Sargassum*, *Turbinaria*, *Spatoglossum*, *Rosenvingeia* and *Chnoospora*.
- The brown algae *Laminaria* and *Fucus* are important seafood in China, Japan and Korea. Plants like *Pelvetia* are used as chicken feed and cattle feed in European countries.



*Chnoospora implexa* J.Agardh, 1848

AB.2.1.1.1 Date: 26-5-2009 Locality: Palk Bay





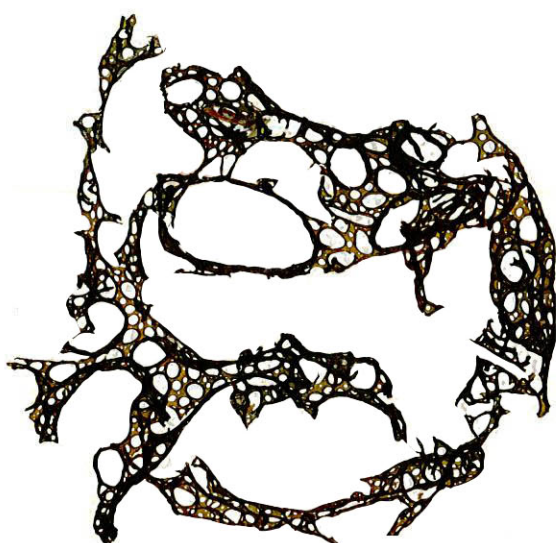
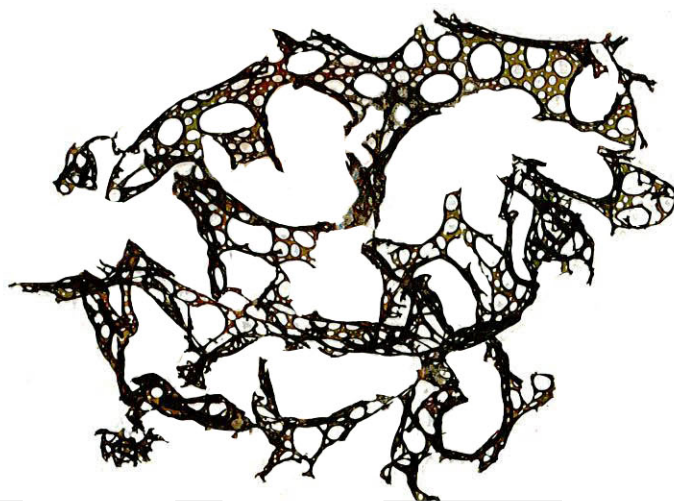
*Dictyota cervicornis* Kuetzing, 1859

AB.1.1.1.1 Date: 1-2-2010 Locality: Palk Bay



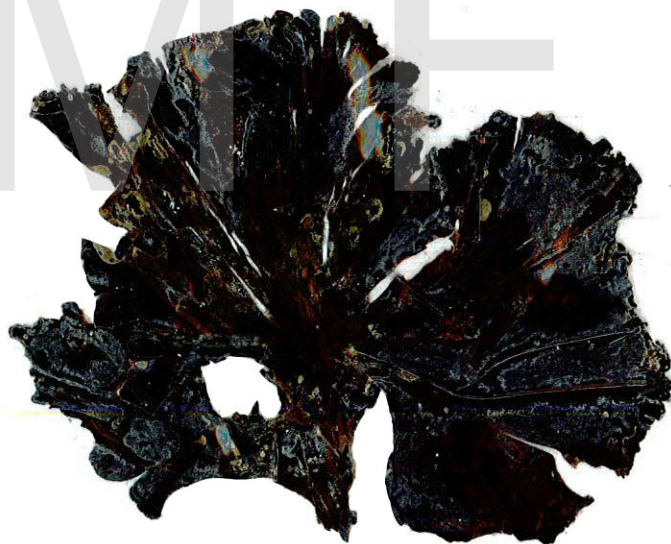
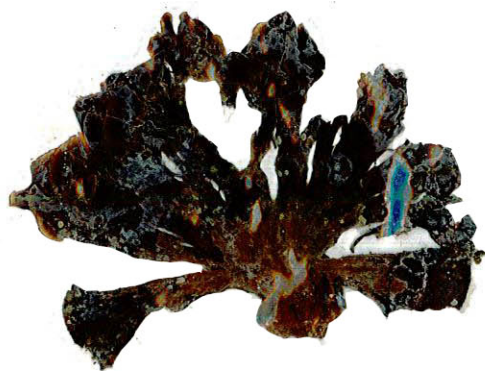
*Dictyota divaricata* Lamouroux, 1809

AB.1.1.1.3 Date: 26-5-2009 Locality: Palk Bay



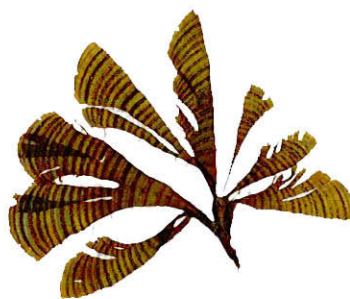
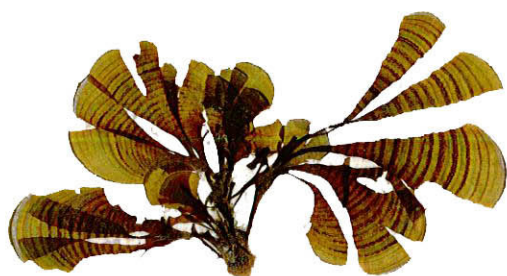
*Hydroclathrus clathratus* (C.Ag.) Howe, 1920

AB.2.2.1.1 Date: 1-2-2010 Locality: Palk Bay



*Lobophora variegata* (Lam.) Womersley, 1977

AB.1.1.3.1 Date: 25-5-2009 Locality: Gulf of Mannar



*Padina tetrastromatica* Hauck, 1887

AB.1.1.2.1 Date: 25-5-2009 Locality: Gulf of Mannar





*Rosenvingeia nhatrangensis* Dawson, 1954

AB.2.2.2.2 Date: 4-2-2010 Locality: Palk Bay



*Sargassum polycystum* C. Agardh, 1824

AB.3.1.1.2 Date: 28-5-2009 Locality: Gulf of Mannar





*Sargassum wightii* Greville, 1848

AB.3.1.1.3 Date: 27-5-2009 Locality: Gulf of Mannar



*Spatoglossum asperum* J.Agardh, 1894

AB.1.1.5.1 Date: 2-2-2010 Locality: Palk Bay



*Stoechospermum marginatum* (C.Ag.) Kuetzing, 1843

AB.1.1.4.1 Date: 2-2-2010 Locality: Gulf of Mannar



*Turbinaria conoides* (J.Ag.) Kuetzing, 1860

AB.3.1.2.1 Date: 25-5-2009 Locality: Gulf of Mannar



# SEAGRASS

## CLASS MONOCOTYLEDONAE

- Seagrasses are marine flowering plants classified under the super order Alismatiflorae, belonging to one of the six families of the class Monocotyledonae.
- From the Indian coast, 14 species under seven genera have been reported (Maurice Schwartz, 2005).
- Grow in shallow and sheltered coastal waters, anchored in sandy or muddy bottoms.
- Grass like forms with well developed creeping rhizome which is the important anchoring part of the plant. Leaves are specialised with reduced cuticle and the epidermis lack stomata. Roots can live in anoxic environment depending on oxygen transport from the leaves and rhizome.
- Produce flowers and pollinate under water with specialized pollen. The seeds produced under water are dispersed by both biotic and abiotic agents.
- Structure the seabeds on which they grow into complex ecosystems harbouring a variety of organisms and function as nursery grounds for many commercially important species.





*Cymodocea rotundata* Ehrenb. & Hempr., 1870

A1A.1.1.3.2 Date: 25-5-2009 Locality: Gulf of Mannar



*Cymodocea serrulata* (R. Br.) Ascherson & Magnus

A1A.1.1.3.1 Date: 29-5-2009 Locality: Palk Bay



*Enhalus koenigi* Richard, 1812

A1A.1.2.2.1 Date: 25-5-2009 Locality: Gulf of Mannar



*Halodule uninervis* (Forssk.) Ascherson, 1882

A1A.1.1.2.1 Date: 25-5-2009 Locality: Gulf of Mannar



*Halophila ovata* Gaudichaud, 1827

A1A.1.2.1.1 Date: 26-5-2009 Locality: Palk Bay





*Syringodium isoetifolium* (Ascher.) Dandy, 1939

A1A.1.1.1.1 Date: 25-5-2009 Locality: Gulf of Mannar

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